Diplazium prescottianum (Wall. *ex* Hook.) Bedd.: a Singapore fern now possibly extinct

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During the months of August to November 1822, Nathaniel Wallich, Superintendent of the Botanic Garden at Calcutta, stayed in Singapore and collected many specimens of native plants. These were dried and added to his great herbarium which consisted mainly of specimens of Indian plants. He gave new names to those of his specimens which he believed to represent hithero unknown species, and a list of these names was duplicated, but as he published no descriptions his names have no status according to the present International Code of Botanical Nomenclature. Duplicates of Wallich's specimens were distributed to various other herbaria, but the Singapore herbarium had not then been founded, so any of his specimens now in Singapore are mostly stray ones which could be spared from Kew, where the main Wallich herbarium now remains.

Many of the ferns to which Wallich gave new names were first described by William Hooker in his *Species Filicum* (five volumes, 1844 – 1864) and among them was no. 235 in Wallich's list, *Asplenium prescottianum,* in Hooker's third volume (1860) p. 251. A photograph of one of two sheets of this collection in Hooker's herbarium is here reproduced. Hooker also cited a specimen collected by Thomas Lobb in Singapore about 1850 which had fewer lobed pinnae but clearly represented the same species; this was called var. β. Another specimen cited was collected by Norris in Penang and named var. γ but this has pinnae differently lobed and represents another species, now known as *Diplazium malaccense* Presl.

We now regard Wallich's species as belonging to the genus *Diplazium,* but Hooker preferred to retain it in *Asplenium* because the arrangement of the sori is almost the same in both. It was not until 1866 that Milde showed a constant anatomical difference between the two genera and also a difference in scales. Other differences are now known, and members of the two genera usually differ in habitat, species of *Diplazium* being almost all terrestrial ferns of forest, and most *Asplenium* plants are epiphytes or grow on rocks. The characters by which *Diplazium* differs from *Asplenium,* as shown by Milde, are also shared by members of the genus *Athyrium,* the name of which is older. So Copeland, in his early work on Philippine ferns, transferred all species formerly known as *Diplazium* to *Athyrium;* he continued this practice in his book Genera Filicum (1947), and in the original edition of my *Ferns of Malaya* I followed Copeland. In 1859 Thomas Moore had published the binomial *Diplazium prescottianum,* without a description, but as Wallich's name was not then valid, Moore's name is also invalid. In 1867 Beddome validated the name *Diplazium prescottianum* by reference to Hooker's description, and published the first illustration. Later, when Beddome wrote his full account of the Indian and Malayan ferns known to him (his *Handbook,* 1883) he ranked Wallich's species as a variety of *Diplazium silvaticum.* As indicated in the Appendix to the second edition of my book, I now accept the genus *Diplazium* as distinct from *Athyrium.* This history can be summarized as follows:

Asplenium prescottianum Wallich, cat. no. 235, invalid name; Hooker, Spec. Fil. 3: 251 (1860), excluding var. γ.

Diplazium prescottianum (Wall. ex Hook.) Beddome, Ferns Br. India: t. 243 (1867); Holttum, Ferns of Malaya ed. 2: 637 (1966).

Diplazium silvaticum var. *prescottianum* Bedd., Handb. Ferns Br. India: 178 (1883).

Athyrium prescottianum (Wall. ex Hook.) Holttum, Ferns of Malaya: 557 (1954).

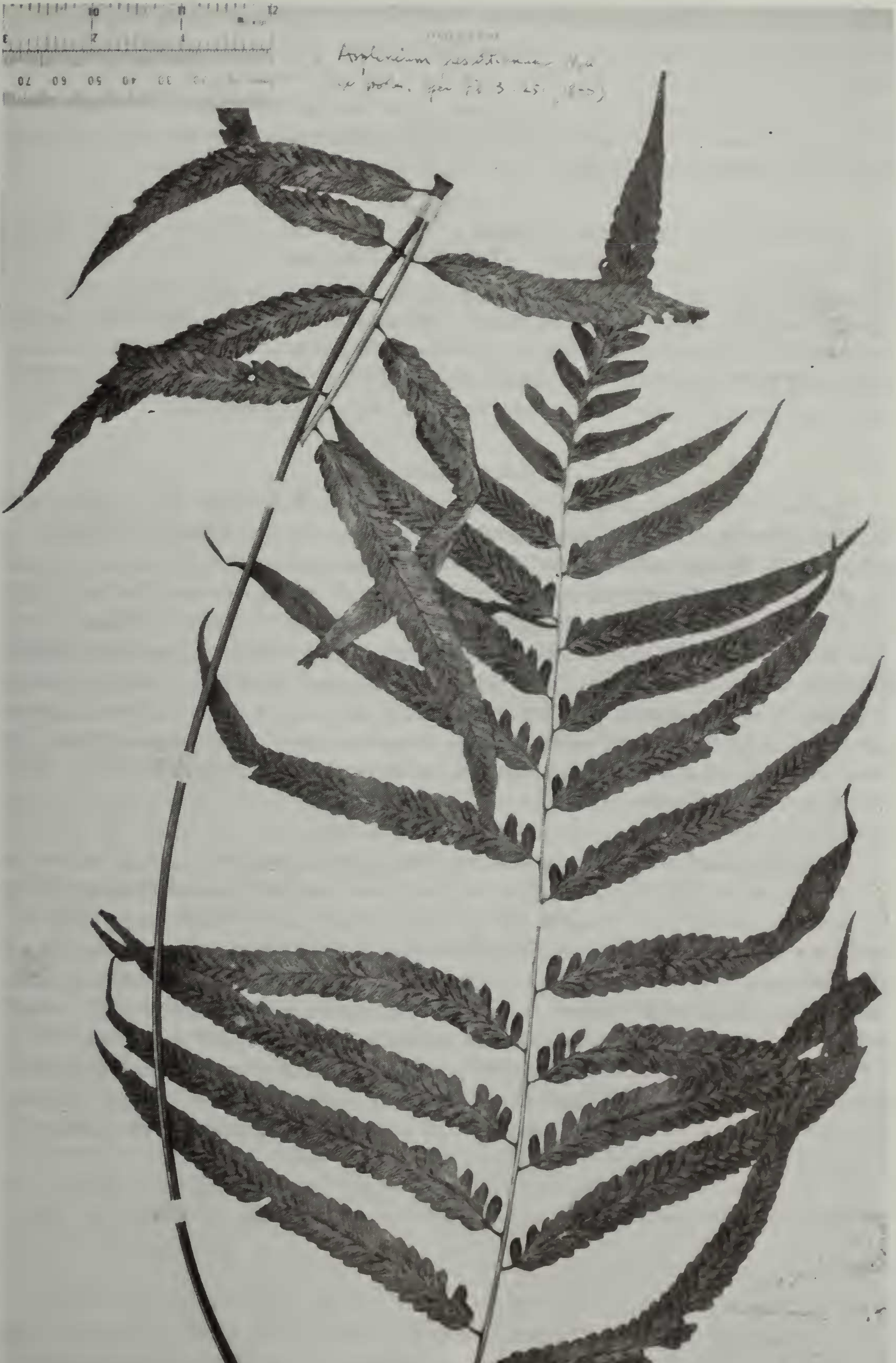
The name *prescottianum* commemorates John Prescott, a botanist who helped Wallich in identifying his specimens of the family Cyperaceae; he died in 1837.

In 1875 H.J. Murton, Superintendent of the original Botanic Garden in Singapore, collected a specimen at Kranji, with no other details. C.G. Matthew, a fleet-surgeon visited Singapore early in the twentieth century collected another between Bukit Panjang and Woodlands. No more specimens were found until 1958 when Sinclair collected specimens at Tanjong Gul, with the following note: "rocky wooded cliffs, at base of cliff; only two plants seen". Sinclair's is the only definite information about the nature of the habitat of this fern. Murton's locality Kranji probably indicates that he found it at the steep seaward face of the hill at Woodlands, which was then still covered with forest trees, like the present cliffs at Labrador.

The very peculiar shape of the pinnae of this species is well shown in the photograph, namely the deep lobing of middle pinnae near their bases on the acroscopic side only, and the long-stalked lower pinnae which have no similar lobing. Fronds of smaller plants have fewer lobed pinnae and fewer lobes on each; the specimens of Thomas Lobb and of Sinclair both show this condition. The pinnae are of a much firmer consistency than those of most species of *Diplazium* in Malaya; this is probably to be correlated with the semi-exposed position in which the plants grow. Most species of this genus grow only in the full shade of forest. I suggest that the most likely places where other plants of *D. prescottianum* may exist are in the Indonesian islands near Singapore. My impression is that collecting there has been less thorough than in Singapore, but there may be specimens, unreported, in the herbarium at Bogor.

As indicated on p.557 of the original edition of my book on the ferns of Malaya, I tentatively included also in this species some specimens from Selangor and Perak. But later study convinced me that they represented another species, not yet named; a comment to this effect is made on p.637 of the second edition. *D. prescottianum* has been more recently reported (as *Athyrium prescottianum*) by S. C. Chin as occurring at Gua Panjang in Kelantan (Gard. Bull. 30: 210, 1975). I have now seen a photograph of a specimen from this collection (UNESCO Limestone Expedition 1962, no. 517); in my opinion it belongs to the species *Diplazium crenato-serratum* (Bl.) Moore.

The number of species of *Diplazium* in S.E. Asia and Malesia is very large, and many of them have never been adequately described, so that the application of such names as exist is often doubtful. The detailed structure of the scales which cover the apex of rootstocks and the bases of stipes provide useful and precise diagnostic characters but these



Photograph of a sheet from the type collection of *Asplenium prescottianum* Wall. in Kew Herbarium. *Courtesy of the Director, Royal Botanic Gardens, Kew.*

scales are often missing from herbarium specimens and in many species they have not been well described; this is true of the species of India where more exist than those recognized in Beddome's works. Type specimens need re-describing so that the precise meaning of existing names may be established before new names are given. Probably there are many Malesian species still undescribed; even in Peninsular Malaysia, one of the best-studied areas, there are still some.

However *D. prescottianum* is peculiar in two ways. First, it has very obvious distinctive characters, so that it is unlikely to have escaped the notice of collectors. Secondly, it does not grow in high forest, and if it exists away from the sea it must be in some more open, though not fully exposed places; it is probably adapted to peculiar habitat-conditions which are not common. So it may be now on the verge of extinction, if not already extinct. If further plants of this species are found, I hope that someone will try to grow new ones from spores, not destroy them in making more dried specimens.

Another fern which grows in somewhat similar habitats near the sea in Singapore is *Dipteris conjugata,* but this species certainly occurs abundantly elsewhere in Malesia, on mountains at altitudes of about 600 to 1800 m, in open places, and is conspicuous at all hill stations. It was formerly present in several small colonies on the steep sea-facing cliffs at Labrador, where it had strong light from the sea and little overhead shade. It also occurred in at least two places near the sea in the N.W. of Singapore, and Sinclair found plants on Pulau Serimbun in 1953. Unless specially protected and brought to public attention, it is likely to disappear from Singapore. It differs from *Diplazium prescottianum* in having a creeping rootstock which can go on growing indefinitely, whereas *Diplazium* has a more or less erect rootstock which is of limited growth and plants need to be renewed from spores periodically.

Dipteris conjugata does not renew itself from spores in Singapore. It only does this at altitudes of about 600 m or more above sea level, as anyone who walks up Penang Hill by the old path can easily see; at about 600 m altitude young plants of *Dipteris* are abundant, but below that level there are none. This must be an effect of temperature; the spores will not germinate, or the prothalli will not produce their generative organs, at the warmer temperature of sea level. I believe that *Dipteris* became established on the Labrador cliffs during the ice age when the sea level was lower than it is now, and the temperature at Labrador was like that of the top of Penang Hill today; and that the *Dipteris* persisted because it could not be fully overshaded by forest growth on that steep ground. However, this is unlikely to be the explanation of the presence of *Diplazium prescottianum* in Singapore.